

# INTERACTIONS BETWEEN PARTICULATE AND TEMPERATURE ON MORTALITY OF CIRCULATORY SYSTEM DISEASES IN BEIJING, CHINA

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**Background and Aims:** To explore the interaction between particulate matter (TSP and PM<sub>10</sub>) and temperature on mortality caused by circulatory system disease in different genders.

**Methods:** A Poisson semi-parametric generalized additive models (GAM) was used to examine whether there is interactive effects of particulate matter and temperature on mortality of circulatory system disease. The split point of low, medium, high temperature layer was determined based on the sensitivity tests. The interaction between atmospheric particulate matter (TSP and PM<sub>10</sub>) and daily average temperature on daily mortality caused by circulatory system disease was analyzed through comparing the effects of atmospheric particulate matter in high/low and medium temperature layer.

**Results:** A 10 $\mu\text{g}/\text{m}^3$  increase in TSP and PM<sub>10</sub> with an increase of 0.055% (P=0.160) and 0.268% (P=0.002) in mortality cause by circulatory system disease. According to the results of sensitivity tests, P<sub>20</sub>/P<sub>80</sub> and P<sub>25</sub>/P<sub>75</sub> were determined as the split point of low, medium, high temperature layer. In the model with P<sub>20</sub>/P<sub>80</sub> split point as the temperature stratification, a 10 $\mu\text{g}/\text{m}^3$  increase in TSP was associated with an increase of 0.244% (P=0.088), 0.015% (P=0.0180) and 0.437% (P<0.001) in mortality cause by circulatory system disease at high, medium and low temperature, while in the model with P<sub>25</sub>/P<sub>75</sub> split point as the temperature stratification, the increased percentage were 0.196% (P=0.126), 0.016% (P=0.733) and 0.116% (P=0.054). With the 10 $\mu\text{g}/\text{m}^3$  PM<sub>10</sub> increase, the percentage of mortality will increase 0.408% (P=0.066), 0.240% (P=0.011) and 0.342% (P=0.072) in high, medium and low temperature when P<sub>20</sub>/P<sub>80</sub> as the split point of temperature, 0.602% (P=0.007), 0.209% (P=0.030) and 0.340% (P=0.047) when P<sub>25</sub>/P<sub>75</sub> as the split point of temperature.

**Conclusion s:** All results suggested that both particulate matter and daily average temperature may effect on daily mortality caused by circulatory system diseases independently. Forthmore, there was interaction on the mortality caused by circulatory system diseases between TSP, PM<sub>10</sub> and high/low temperature.